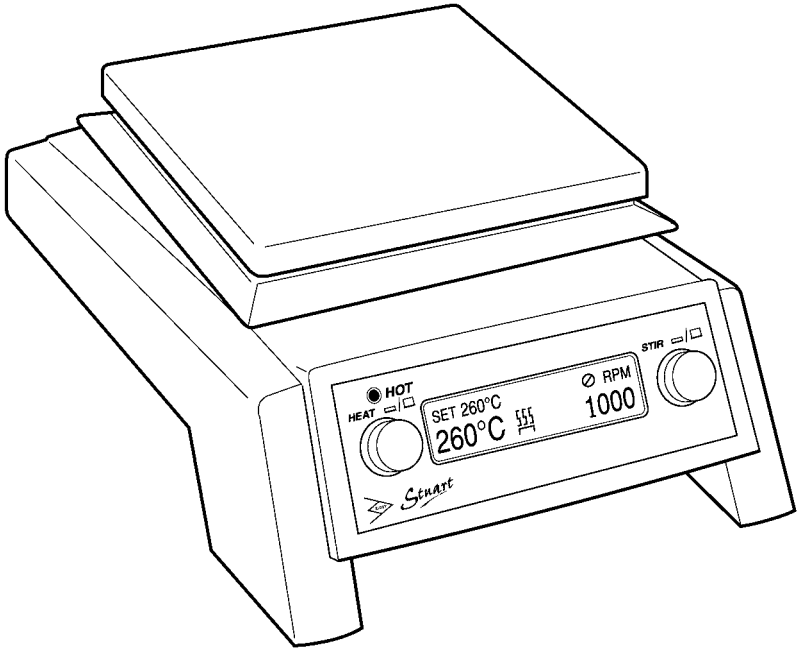
Bibby Sterilin

Digital Hotplate
Service Manual

Models
SD162
CD162
SD160



230v 50/60Hz

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Introduction

This service manual is intended for use by persons who are suitably qualified in the repair of both mechanical and electrical equipment.

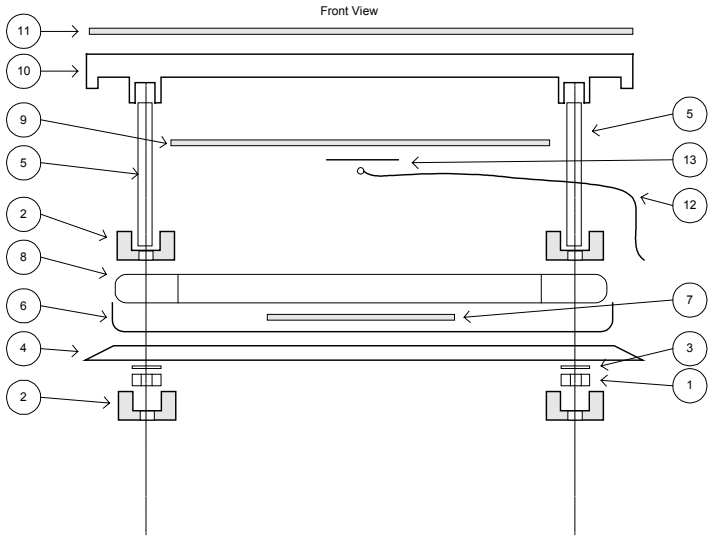
- Always Ensure the unit is disconnected from the mains electricity supply before attempting maintenance or servicing.
- Only Suitably qualified personnel will undertake any repairs or replacement of parts.
- Only spare parts supplied or specified by Bibby Sterilin or its agents should be used. Fitting of non-approved parts may affect the performance and safety features designed into the instrument.
- After repair always conduct a full electrical safety test (using appropriate equipment).

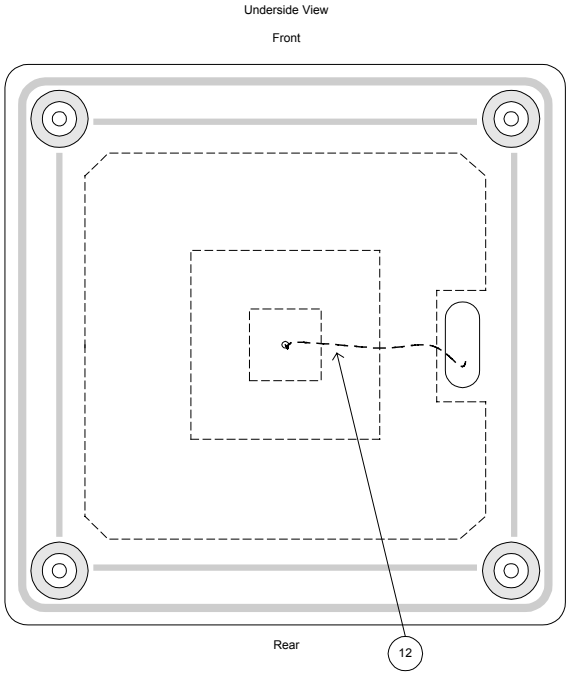
Digital Hotplate Technical Data

Digital Hotplate Technical Data			
Model	SD162	CD162	SD160
Heater Power W	700	500	700
Max Plate Temp °C	325	450	325
Liquid Temp Range °C	50 - 200		-
Stirrer Speed Rpm	200 - 1300		-
Stirrer Motor	12v DC Brushless 700807(S)		-
Supply Current At 230V	3.06A	2.2 A	3.06A
Heater Resistance Cold Ω	75.5	105.8	75.5
Display PCB	700889(ES) (Metal S/W)	700830(ES) (Ceramic S/W)	700945(ES) (SD160 S/W)
Main PCB	700831(ES)		
Internal Fuses	5A 'T'	3.15A 'T'	5A 'T'
Unit Size (W x D x H)	190x305x111	190x305x109	190x305x122
Electrical Supply	230V 50/60Hz		

1.0 Hotplate Mechanical Assembly

1.1 CD162 Ceramic top Assembly Drawing

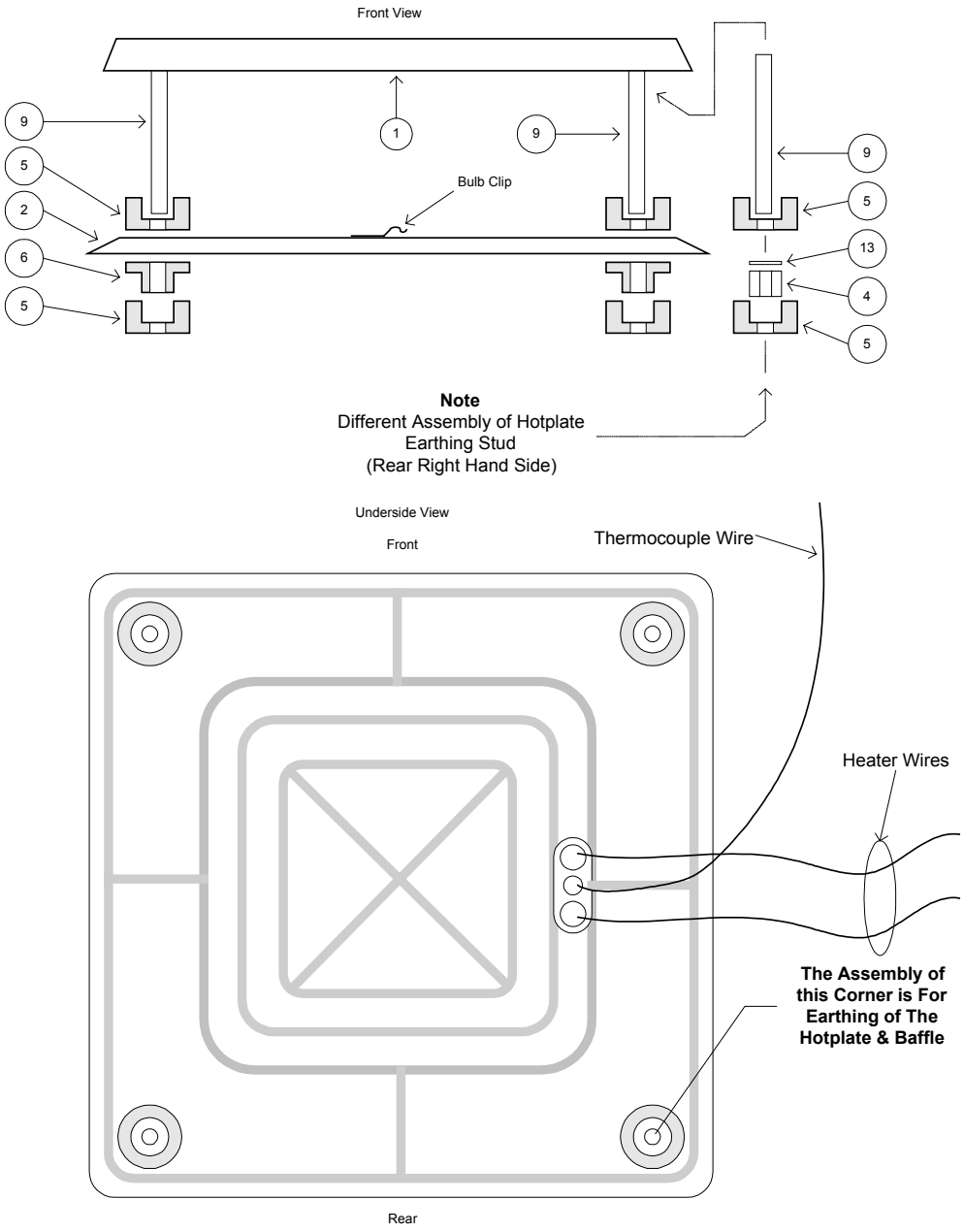




1.2 CD162 Ceramic Top Parts List

CD162 230v Ceramic Hotplate Parts List			
Item	Qty	Part No	Description
1	4	402002	M4 Nut
2	8	700733	Ceramic Spacer Female
3	4	700105	Shake-proof Washer
4	1	700771	Baffle Plate
5	4	700772	M4 50mm Stud
6	1	700753	Pressure Tray
7	1	700752	Liner Plate
8	1	700745	Microtherm Pad
9	1	700755(S)	Mica Clad Element 230v 500W
10	1	I/700739	Carrier Frame (Tile Assembly Complete)
11	1		Ceramic Tile
12	1	HC502-24	Thermocouple
13	1	700790	Thermocouple Insulation Pad

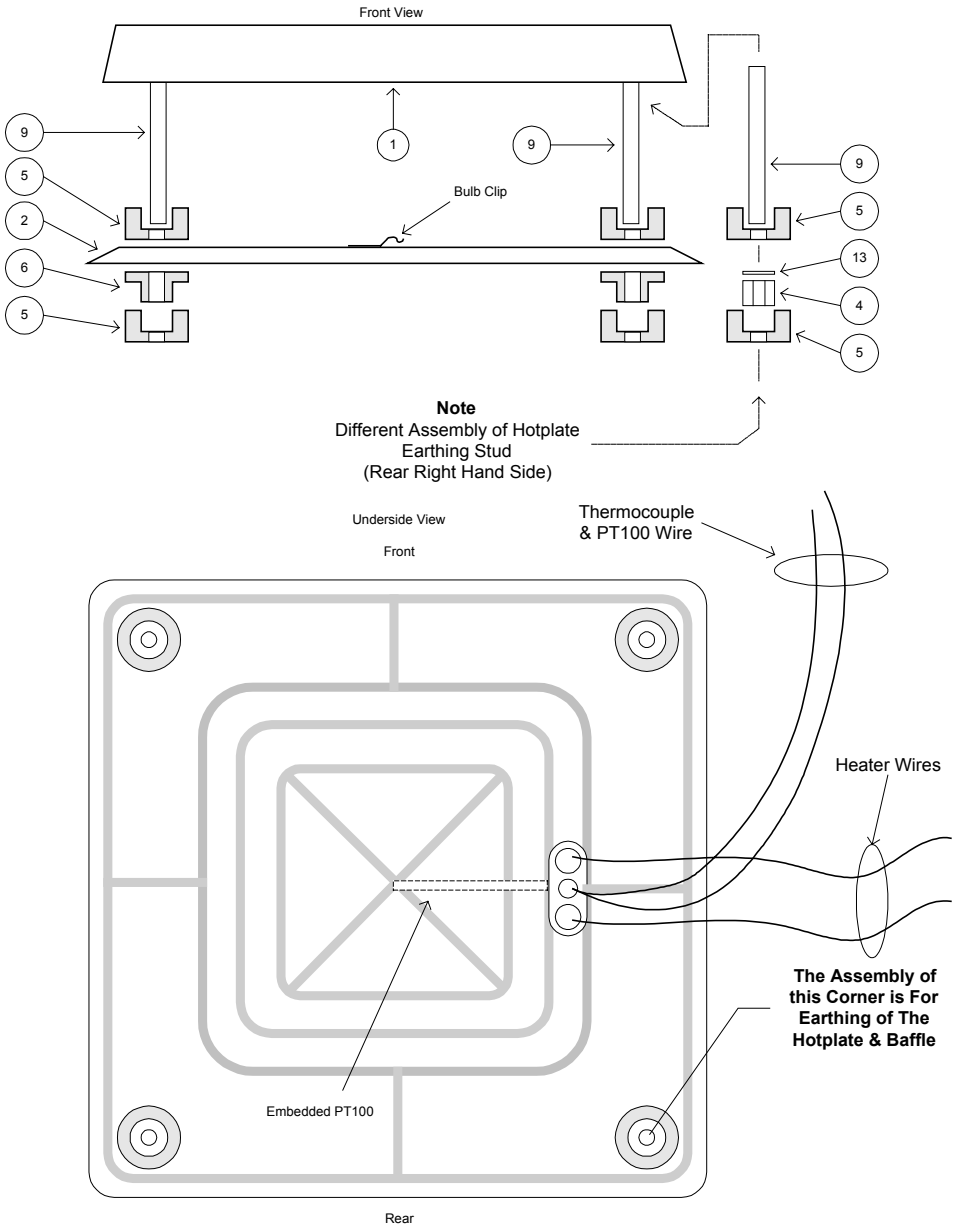
1.3 SD162 Metal top Assembly Drawing



1.4 SD162 Metal Top Parts List

SD162 230v Metal Hotplate Parts List			
Item	Qty	Part No	Description
1	1	700741(S)	Aluminium Hotplate 230V 700W C/W Thermocouple
2	1	700750	Baffle Plate Complete with Bulb Clip
3	5	700105	M4 Shake-proof Washer
4	1	700732	Metal Spacer
5	8	700733	Ceramic Spacer Female
6	7	700744	Ceramic Spacer Male
7	4	700772	M4 x 50mm Stud

1.5 SD160 Metal top Assembly Drawing

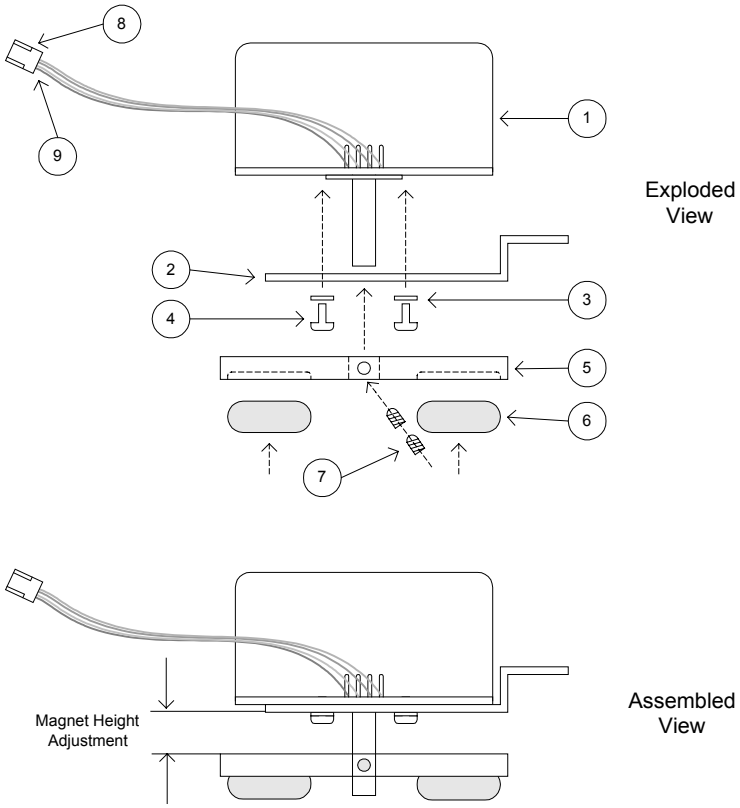


1.6 SD160 Metal Top Parts List

SD160 230v Metal Hotplate Parts List			
Item	Qty	Part No	Description
1	1	700944(S)	Aluminium Hotplate 230V 700W 25mm
2	1	700750	Baffle Plate Complete with Bulb Clip
3	5	700105	M4 Shake-proof Washer
4	1	700732	Metal Spacer
5	8	700733	Ceramic Spacer Female
6	7	700744	Ceramic Spacer Male
7	4	700772	M4 x 50mm Stud

2.0 Stir Motor

2.1 Stir Motor Assembly



2.2 Stir Magnet height adjustment

To ensure the correct clearance between the magnets and the base of the hotplate adjust the gap as shown above to 11mm (metal top) or 7mm (ceramic top). Secure the magnet support bar in the correct position using the two 4mm grub screws.

2.3 Stir Motor Parts List

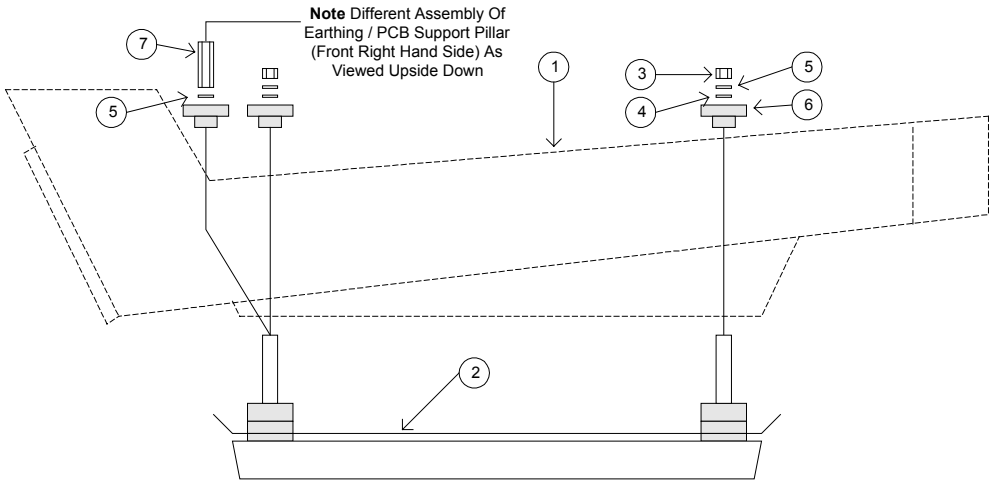
Stir Motor Parts List			
Item	Qty	Part No	Description
1	1	700807(S)	12v DC Motor Premotec
2	1	700819	Motor Mounting Bracket
3	4	700071	M3 Shakeproof Washer
4	4	700818	M3 x 4 Long Pan Head Screw
5	1	700811	Magnet Support Bar
6	2	700730	Neodymium Iron Boron Magnet
7	2	700816	M4 x 4 Long Grub Screw
8	1	700837	4 Way Crimp Terminal
9	4	700838	Crimp Terminal For Motor

2.4 Stir Motor Wiring Details

Stir Motor Wiring Details (JP1)		
Pin	Wire Colour	Description
1	Green	Motor Tacho Output
2	Red	+ 12V Supply
3	White	Speed Control Input (DC 0-5v)
4	Blue	0V

3.0 Casting Assembly

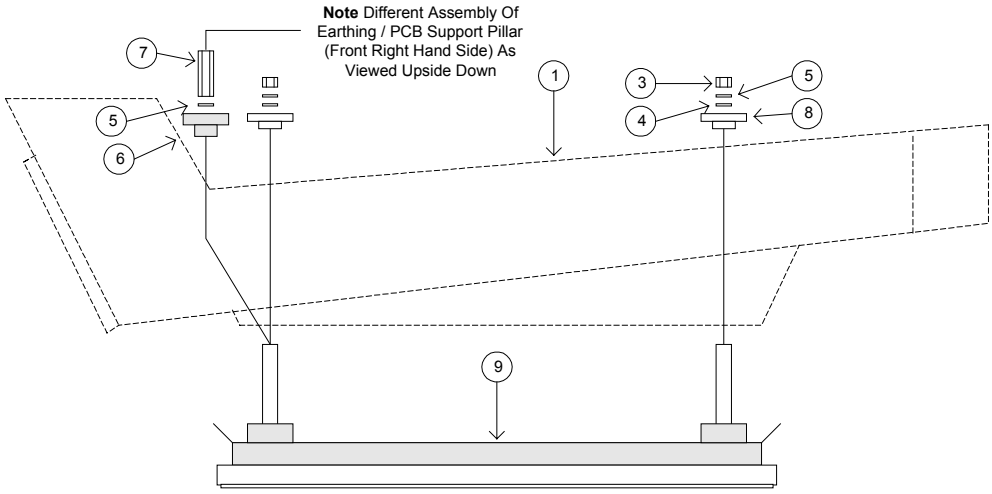
3.1 SD162 & SD160 Metal Top Heater & Casting Assembly



3.2 Metal Top To Casting Assembly Parts List

Heater To Casting Assembly Parts List (Metal)			
Item	Qty	Part No	Description
1	1	700808	Main Body Casting (SD162)
2	1	-	Metal Hotplate Assembly Complete
3	3	402002	M4 x 0.7 Hex Full Nut
4	3	613003	M4 Washer
5	4	700105	M4 Shake Proof
6	4	700744	Ceramic Spacer H370 (Male)
7	1	700823	M4 x 25 Hex Spacer

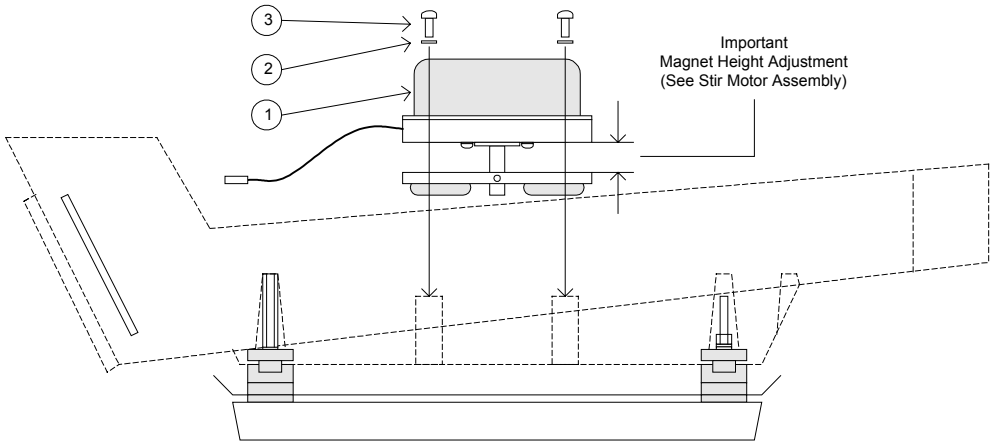
3.3 CD162 Ceramic Top Heater & Casting Assembly



3.4 Ceramic Top To Casting Assembly Parts List

Heater To Casting Assembly Parts List (Ceramic)			
Item	Qty	Part No	Description
1	1	700808	Main Body Casting (SD162)
2	-	-	
3	3	402002	M4 x 0.7 Hex Full Nut
4	3	613003	M4 Washer
5	4	700105	M4 Shake Proof
6	1	700744	Ceramic Spacer H370 (Male)
7	1	700823	M4 x 25 Hex Spacer
8	3	700791	Insulation Washer Nylon
9	1	-	Ceramic Hotplate Assembly Complete

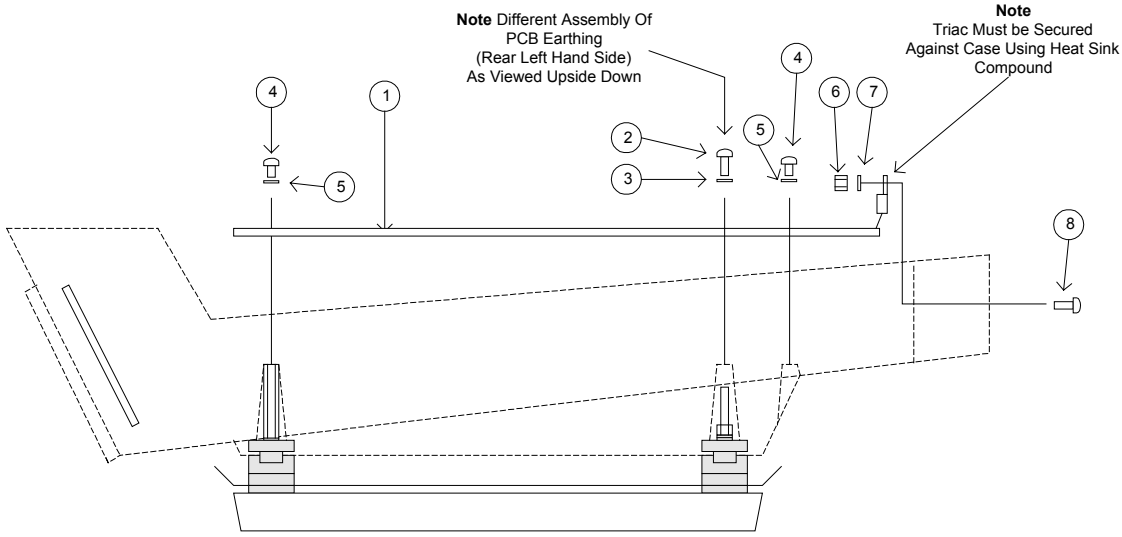
3.5 Stir Motor & Casting Assembly



3.6 Stir Motor To Casting Assembly Parts List

Stir Motor To Casting Assembly Parts List			
Item	Qty	Part No	Description
1	1	-	Complete Stir Motor Assembled
2	2	700105	M4 Shake Proof Washer
3	2	700311	M4 Panhead Screw 8mm Long

3.7 Main Board & Casting Assembly (All Models)



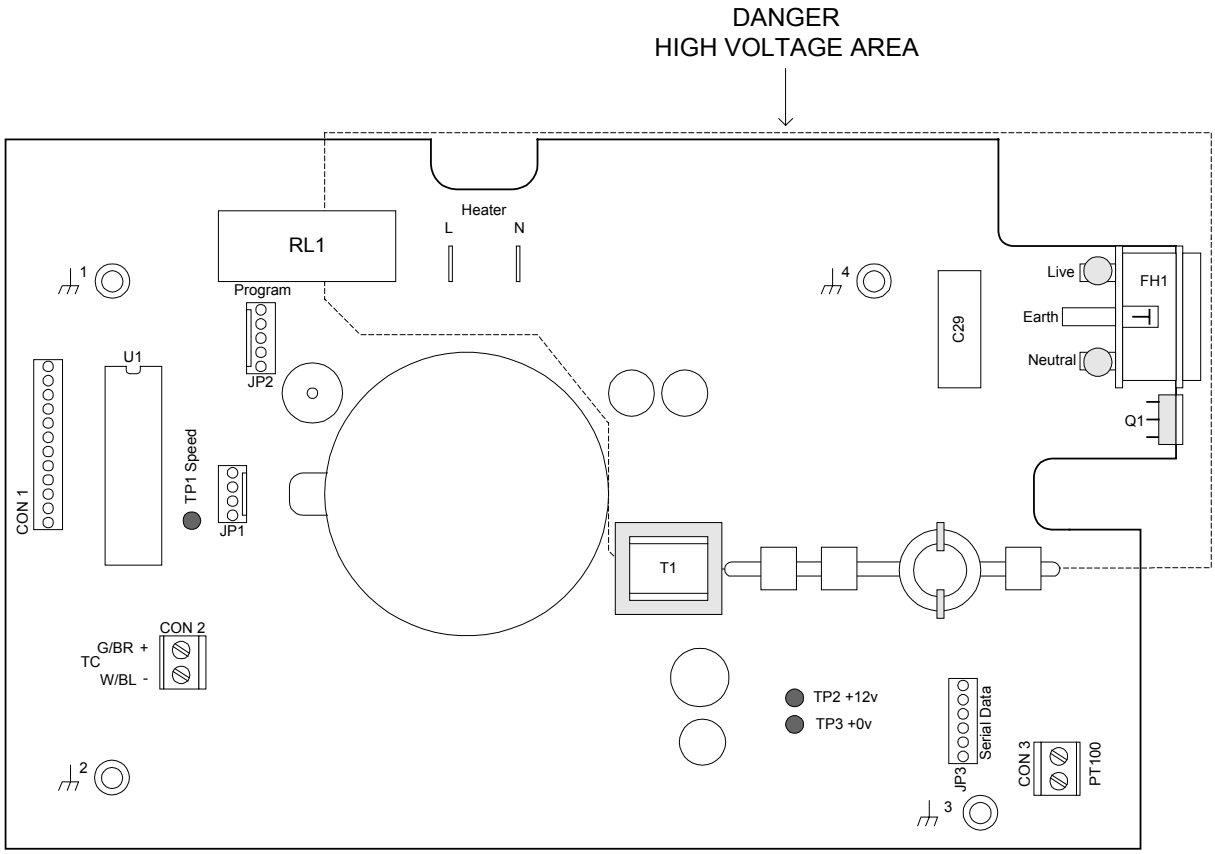
3.8 Main Board To Casting Assembly Parts List (All Models)

PCB To Casting Assembly Parts List (Metal & Ceramic)			
Item	Qty	Part No	Description
1	1	700831	Premium II Main Board
2	1	700311	M4 Panhead Screw 8mm Long
3	1	700105	M4 Shake Proof Washer
4	3	700554	M4 x 6 Pozi Pan Head Screw
5	3	NSPCR1	Fibre Washer M4
6	1	402001	M3 x 0.5 Hex Full Nut
7	1	700071	M3 Shake Proof Washer
8	1	700567	M3 x 10mm Pozi Pan Head Screw

Note the same main board (700831) and assembly procedure is used in both the metal and ceramic versions.

4.0 Main Board

4.1 Main Board Layout



4.2 Main Board Connection Details

Main Board Connection Details		
Connector	Description	Comments
FH1	Fused IEC Mains Inlet	230v 50/60Hz Supply Input
Heater L & N	Heater Output	Connect to Heater Live & Neutral
JP1	Motor Output	Connect to Stir Motor
JP2	Program Port	Not Used Factory use only
JP3	RS232 Output	Not used
CON1	Display Data & Supply	Connect to Display PCB
CON2	Thermocouple Input	Hotplate thermocouple (+ Green/Brown & -White/Blue)
CON3	PT100 Probe Input	Probe Input Connector (polarity not important)
TP1	Motor speed control 0-5vdc	Service use only
TP2	+12 volt Test Point	Service use only
TP3	0 volt Test Point	Service use only
Earth 1	General Support / Earth	
Earth 2	Hotplate Earthing Point	Must Be Secured to Provide Hotplate Earth Via Pillar
Earth 3	General Support / Earth	
Earth 4	Casting Earthing Point	Must Be Secured Using Shake Proof Washer

Safety Notes

1. Very high voltages are present around the switched mode power supply area of the main board (as indicated in the layout diagram above). Always disconnect the mains supply and allow several minutes for these voltages to discharge before attempting to remove or service the board.
2. This equipment is earthed via the main board. Removal of the main board will disconnect the earth from both the casting and heater assembly. Always ensure the main board is secured in position using the correct fixings before the mains supply is reconnected.

5.0 Parts Lists

5.1 SD162 Complete Parts List

SD162 Parts List (Top Level)		
Item	**Description**	**Qty**
DC0717	SMALL BOX 410 X 335 X 223MM	1
DC0732A/FIT	LEFT HAND FITMENT SAMPLE REF	1
DC0732B/FIT	RIGHT HAND FITMENT SAMPLE	1
HH058	HIGH TEMP TY WRAP	10
HH114	FOLLOWER FOR HALOGEN	1
HH149	ANTI-VIBRATION FOAM 12MM	0.001
HH179(S)	UK MAINS LEAD MOULDED PLUG	1
HH180(S)	EUROPEAN MAINS LEAD WITH PLUG	1
NSPCR1	FIBRE WASHER M4	3
N165	SCREW M4 X 10 POZI/PAN	3
402001	M3X0.5 HEX FULL NUT	2
402002	M4X0.7 HEX FULL NUT	12
613003	WASHER (M4)	2
700071	M3 SHAKEPROOF WASHER	3
700105	M4 SHAKE PROOF WASHER	24
700309	M3 PLAIN WASHER BRIGHT ZINC	4
700311	M4 PANHEAD SCREW 8MM LONG	3
700343	HEAT SHRINK TUBE 3.2 BORE	2
700554	M4 X 6 POZI PAN HEAD SCREW	6
700598	CE LABEL 38MM X 38MM	1
700606	M4X10 LG TAPTITE P/PAN	8
700617	'IMPORTANT NOTICE' LEAFLET	1
700730	NEODYMIUM IRON BORON MAGNET	2
700732	MOTOR MOUNTING SPACER TYPE	1
700733	CERAMIC SPACER H375 FEMALE	8
700736	SUPPORT FOOT TYPE PD2014	4
700738(S)	MAINS FUSE 5A 'T' TIME DELAY	2
700741(S)	TOP CASTING WITH EMBEDDED	1
700742	HOTPLATE BASE (VENTED)	1
700743	PCB SUPPORT M4 TYPE TCBNT1M4	1
700744	CERAMIC SPACER H370 (MALE)	8
700750	BAFFLE PLATE ASSEMBLY	1
700772	M4 X 50MM LONG ALLTHREAD	4
700787	GUARANTEE CARD	1
700788(S)	HEAT WARNING LABEL	1
700807(S)	12V DC MOTOR PREMOTEC	1
700808	MAIN BODY CASTING (SD162)	1
700811	MAGNET SUPPORT BAR	1
700812	FRONT PANEL OVERLAY	1
700814(S)	RATING LABEL (SD162)	1
700815(ES)	INSTRUCTION MANUAL (PREMIUM)	1
700816	M4 X 4 LONG GRUB SCREW	2
700817	FRONT PANEL (SD162, CD162)	1
700818	M3X4 LONG PAN HD SCREW	4
700819	MOTOR MOUNTING BRACKET	1
700821	PTFE PROBE	1
700822	M3 X 12 HEX SPACER. BRASS	2
700823	M4 X 25 HEX SPACER BRASS	1
700831(ES)	PREMIUM II MAIN BOARD	1
700837	4WAY CRIMP TERMINAL FARNELL	1
700838	CRIMP TERMINAL FOR MOTOR	4
700843	PROBE MOUNTING PLATE	1
700844	2 WAY PROBE PANEL SOCKET	1
700845	2 WAY PROBE PLUG FARNELL	1
700848	CONTROL KNOB	2
700889(ES)	PREMIUM II DISPLAY BOARD METAL	1
700892	7/0.2 INSULATED WIRE FOR PROBE	0.002

5.2 CD162 Complete Parts List

CD162 Parts List (Top Level)		
Item	**Description**	**Qty**
DC0717	SMALL BOX 410 X 335 X 223MM	1
DC0732A/FIT	LEFT HAND FITMENT SAMPLE REF	1
DC0732B/FIT	RIGHT HAND FITMENT SAMPLE RE	1
HB502/18(S)	MAIN FUSES 3.15A	2
HH058	HIGH TEMP TY WRAP	9
HH114	FOLLOWER FOR HALOGEN	1
HH149	ANTI-VIBRATION FOAM 12MM	0.001
HH179(S)	UK MAINS LEAD MOULDED PLUG	1
HH180(S)	EUROPEAN MAINS LEAD WITH PLUG	1
I/700739	TILE ASSEMBLY	1
NSPCR1	FIBRE WASHER M4	3
N165	SCREW M4 X 10 POZI/PAN	3
402001	M3X0.5 HEX FULL NUT TO BE	2
402002	M4X0.7 HEX FULL NUT	14
613003	WASHER (M4)	2
700071	M3 SHAKEPROOF WASHER BZP	4
700105	M4 SHAKE PROOF WASHER BZP	14
700309	M3 PLAIN WASHER BRIGHT ZINC	4
700311	M4 PANHEAD SCREW 8MM LONG	2
700343	HEAT SHRINK TUBE 3.2 BORE	2
700554	M4 X 6 POZI PAN HEAD SCREW	6
700567	M3 X 10MM POZI PAN HEAD SCREW	1
700598	CE LABEL 38MM X 38MM	1
700606	M4X10 LG TAPTITE P/PAN	8
700617	'IMPORTANT NOTICE' LEAFLET	1
700730	NEODYMIUM IRON BORON MAGNET	2
700733	CERAMIC SPACER H375 FEMALE	8
700736	SUPPORT FOOT TYPE PD2014	4
700745	THERMAL INSULATOR	1
700752	LINER PLATE	1
700753	PRESSURE PLATE	1
700759	HOTPLATE BASE (UNVENTED)	1
700771	BAFFLE PLATE (CERAMIC VERSION)	1
700772	M4 X 50MM LONG ALLTHREAD	4
700787	GUARANTEE CARD	1
700788(S)	HEAT WARNING LABEL	1
700791	INSULATION WASHER 0.5, 2 X 8	4
700800(S)	TECNHICAL INFORMATION SHEET	1
700807(S)	12V DC MOTOR PREMOTEC	1
700808	MAIN BODY CASTING (SD162)	1
700811	MAGNET SUPPORT BAR	1
700815(ES)	INSTRUCTION MANUAL (PREMIUM)	1
700816	M4 X 4 LONG GRUB SCREW	2
700817	FRONT PANEL (SD162, CD162)	1
700818	M3X4 LONG PAN HD SCREW	4
700819	MOTOR MOUNTING BRACKET	1
700821	PTFE PROBE	1
700822	M3 X 12 HEX SPACER. BRASS NP	2
700823	M4 X 25 HEX SPACER BRASS NP	1
700828	FRONT PANEL OVERLAY (CD162)	1
700829(S)	RATING LABEL (CD162)	1
700830(ES)	PREMIUM II DISPLAY BOARD	1
700831(ES)	PREMIUM II MAIN BOARD	1
700837	4WAY CRIMP TERMINAL FARNELL	1
700838	CRIMP TERMINAL FOR MOTOR	4
700843	PROBE MOUNTING PLATE	1
700844	2 WAY PROBE PANEL SOCKET	1
700845	2 WAY PROBE PLUG	1
700848	CONTROL KNOB	2
700892	7/0.2 INSULATED WIRE	0.002
700930(S)	HEATER ELEMENT	1

5.3 SD160 Complete Parts List

SD160 Parts List (Top Level)		
Item	**Description**	**Qty**
DC0717	SMALL BOX 410 X 335 X 223MM	1
DC0732A/FIT	LEFT HAND FITMENT SAMPLE REF	1
DC0732B/FIT	RIGHT HAND FITMENT SAMPLE RE	1
HH058	HIGH TEMP TY WRAP (SUPPLIER	10
HH149	ANTI-VIBRATION FOAM 12MM WIDE	1
HH179(S)	UK MAINS LEAD MOULDED PLUG	1
HH180(S)	EUROPEAN MAINS LEAD WITH PLUG	1
NSPCR1	FIBRE WASHER M4	3
N165	SCREW M4 X 10 POZI/PAN	3
402001	M3X0.5 HEX FULL NUT TO BE	2
402002	M4X0.7 HEX FULL NUT	12
613003	WASHER (M4)	2
700071	M3 SHAKEPROOF WASHER BZP	3
700105	M4 SHAKEPROOF WASHER BZP	24
700309	M3 PLAIN WASHER BRIGHT ZINC	4
700311	M4 PANHEAD SCREW 8MM LONG	3
700343	HEAT SHRINK TUBE 3.2 BORE	2
700554	M4 X 6 POZI PAN HEAD SCREW	6
700598	CE LABEL 38MM X 38MM	1
700606	M4X10 LG TAPTITE P/PAN	8
700617	IMPORTANT NOTICE LEAFLET	1
700733	CERAMIC SPACER H375 FEMALE	8
700736	SUPPORT FOOT	4
700738(S)	MAINS FUSE 5A 'T' TIME DELAY	2
700944(S)	NEW TOP CASTING WITH EMBEDDED	1
700742	HOTPLATE BASE (VENTED)	1
700743	PCB SUPPORT M4 TYPE TCBNT1M4	1
700744	CERAMIC SPACER H370 (MALE)	8
700750	BAFFLE PLATE ASSEMBLY COMPLETE	1
700772	M4 X 50MM LONG ALL-THREAD	4
700787	GUARANTEE CARD	1
700788(S)	HEAT WARNING LABEL	1
700808	MAIN BODY CASTING (SD162)	1
700812	FRONT PANEL OVERLAY	1
700814(S)	RATING LABEL (SD162)	1
700815(ES)	INSTRUCTION MANUAL (PREMIUM	1
700816	M4 X 4 LONG GRUB SCREW	2
700817	FRONT PANEL (SD162, CD162)	1
700818	M3X4 LONG PAN HD SCREW	4
700822	M3 X 12 HEX SPACER. BRASS NP	2
700823	M4 X 25 HEX SPACER BRASS NP	1
700831(ES)	PREMIUM II MAIN BOARD	1
700945(ES)	PREMIUM II DISPLAY BOARD (SD160)	1

5.4 Main Board PCB Parts List (Used on all models)

Main Board PCB Parts List	
Description	**Reference**
INDUCTOR,CONV,FERRITE,B82144-A2103-K,10uH,1.4A,10%,Axial,0.6"	L2
CAP,CONV,ELEC,22uF,400V,20%,105'C,Radial,5mm,NHG SERIES	C34
CAP,CONV,ELEC,22uF,400V,20%,105'C,Radial,5mm,NHG SERIES	C33
VARISTOR,CONV,GNR10D431K,METAL OXIDE,275VDC,155J,10mm	VDR1
IC,CONV,AtoD,AD7705BN,DIP16	U3
TRANSDUCER,CONV,M3-CPM121AOAWP-T,PIEZO ELECTRIC,15V,10mA,0.3"	ALM1
IC,CONV,SwMode,TNY256Y,TO-220-7B	U9
OPTO,CONV,COUPLER,TLP621GB,SINGLE,TRANSISTOR,DIP4	U10
INDUCTOR, CONV,FERRITE,B82144-A2474-J,470uH,280mA,5%,Axial,0.6Inch	L1
RES,CONV,WIRE WOUND,47R,2.5W,5%,0.7",WR250	R34
RES,CONV,WIRE WOUND,47R,2.5W,5%,0.7",WR250	R35
CAP,CONV,CER,220pF,100V,10%,85'C,Radial,5mm,DC3 SERIES	C36
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C6, 17, 1, 2
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C4, 7, 8, 14
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C16, 3, 18, 19
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C38
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C15
CAP,CONV,CER,100nF,100V,-20%,+85%,85'C,Radial,2.5mm,MD Y5V SERIES	C5
CAP,CONV,TANT,22uF,6.3v,20%,85'C,Radial,0.2",TX SERIES	C21
CAP,CONV,TANT,22uF,6.3v,20%,85'C,Radial,0.2",TX SERIES	C20
CON,CrimpTerminal,Plug,1 WAY,1A,2.54mm,FAST-ON P11CB MOUNT	HEATER_N 1
CON,CrimpTerminal,Plug,1 WAY,1A,2.54mm,FAST-ON P11CB MOUNT	HEATER_L 1
CON,PCBConnect,Header,6 WAY,1A,2.54mm,VERTICAL	JP3
CON,PCBConnect,Header,2WAY,1A,2.54mm,VERTICAL	LK1
TRIAC,CONV,ISOLATED,BTA16-600B,600V,16A,TO-220	Q1
DIODE,CONV,SWITCHING,1N4148,75V,150mA,0%,DO-35	D3, 5, 12, 4
DIODE,CONV,BRIDGE_RECTIFIER,DI106,600V,1A,0%,DIP4	BR1
RIVET,ALUMINIUM,3mm,10mm	FOR U9
FUSE,QUICK BLOW,5A,250V,20mm	FS1
FUSE,QUICK BLOW,5A,250V,20mm	FS2
IC,CONV,OPAMP,LM358N,DIP8	U7
OPTO,CONV,MOC3043,TRIAC DRIVER,SINGLE,TRIAC,DIP6	U6
IC,CONV,VReg,LM78L05,TO-92	U8
RES,CONV,MF,2K,0.25W,1%,0.4",MF25 SERIES	R13
RES,CONV,MF,2K,0.25W,1%,0.4",MF25 SERIES	R12
RES,CONV,MF,470K,0.25W,1%,0.4",MF25 SERIES	R33
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R10
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R9
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R8
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R2
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R39
RES,CONV,MF,4.7K,0.25W,1%,0.4",MF25 SERIES	R40
RES,CONV,MF,51R,0.25W,1%,0.4",MF25 SERIES	R21
RES,CONV,MF,1K,0.25W,1%,0.4",MF25 SERIES	R30
RES,CONV,MF,470R,0.25W,1%,0.4",MF25 SERIES	R25
RES,CONV,MF,470R,0.25W,1%,0.4",MF25 SERIES	R24
RES,CONV,MF,470R,0.25W,1%,0.4",MF25 SERIES	R26
RES,CONV,MF,330R,0.25W,1%,0.4",MF25 SERIES	R22
RES,CONV,MF,1.5K,0.25W,1%,0.4",MF25 SERIES	R18
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R7
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R6
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R5
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R4
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R1
RES,CONV,MF,10K,0.25W,1%,0.4",MF25 SERIES	R3
RES,CONV,MF,100R,0.25W,1%,0.4",MF25 SERIES	R17
RES,CONV,MF,100R,0.25W,1%,0.4",MF25 SERIES	R16
OPTO,CONV,COUPLER,TLP620(GB),SINGLE,TRANSISTOR,DIP4	U5
PTFE CRYSTAL INSULATING PAD	(X2)
TRANSISTOR,CONV,MOSFET,P-Channel,ZVN3306A,60V,90mA,TO-220	TR1
CON,Socket,3 WAY,0,FREE ISSUE BIBBY,?	FH1
CAP,CONV,ELEC,1000uF,16V,20%,105'C,Radial,5mm,FC SERIES	C31
CAP,CONV,CER,2.2nF,1000V,10%,85'C,Radial,5mm,DE SERIES	C30
OSC,CONV,Crystal,2.4576MHZ,HUDSON,30pF,HC-49/U	X2
CAP,CONV,TANT,10uF,35V,20%,85'C,Radial,0.2",TX SERIES	C25
CAP,CONV,TANT,10uF,35V,20%,85'C,Radial,0.2",TX SERIES	C26
CAP,CONV,TANT,10uF,35V,20%,85'C,Radial,0.2",TX SERIES	C39
CAP,CONV,CER,22pF,100V,5%,85'C,Radial,0.1",DC3 SERIES	C23
CAP,CONV,CER,22pF,100V,5%,85'C,Radial,0.1",DC3 SERIES	C22
CAP,CONV,CER,22pF,100V,5%,85'C,Radial,0.1",DC3 SERIES	C24
CAP,CONV,CER,470pF,100V,10%,85'C,Radial,5mm,DC3 SERIES	C28
PCB,11505,B	PCB1/PCB2
CAP,CONV,CER,10nF,100V,20%,85'C,Radial,5mm,DC3 SERIES	C27
IC,CONV,Micro,PIC16F876-20/SP,DIL28	U1
TOROIDAL CORE 16X9.6X6.3 N30	CT1
DIODE,CONV,V REF,LM285Z12,1.235V,500mW,1%,TO-92(ELINE)	D1
RELAY,CONV,K4TA12,SPST,24V DC,12A,1440	RL1
CON,PCBConnect,Header,4WAY,3A,2.54mm,VERTICAL LOCKING	JP1
RES,CONV,MF,100K,1W,5%,0.4",PF01 SERIES	R37
CAP,CONV,ELEC,1000uF,35V,20%,105'C,Radial,5mm,FC SERIES	C37
TRANSFORMER,CONV,PCB,PRI: 85-265V,SEC: 12V,11VA,EF-20	T1
RES,CONV,MF,1M,0.25W,1%,0.4",MF25 SERIES	R29
RES,CONV,MF,1M,0.25W,1%,0.4",MF25 SERIES	R28
CAP,CONV,POLYx2,470nF,275V,20%,100'C,Radial,22.5mm,R46 SERIES	C29
RES,CONV,MF,100M,0.25W,5%,0.4",RGP0207CH SERIES	R14
RES,CONV,MF,10M,0.25W,1%,0.4",MF25 SERIES	R15
IC,CONV,Memory,FM25040-P,DIP8	U2
RES,CONV,FUSEABLE,1R,0.5W,5%,0.5",FR50 SERIES	R36
HEATSINK,132P25 H/B,PREMIUM HOTPLATE II	HS1
RES,CONV,MF,2.2R,0.25W,1%,0.4",MF25 SERIES	R27
RES,CONV,MF,220R,0.25W,1%,0.4",MF25 SERIES	R38
TEST PIN-LOOP	TP3
TEST PIN-LOOP	TP2
CON,CrimpTerminal,Plug,5WAY,3A,2.54mm,VERTICAL	JP2
OSC,CONV,RESONATOR,8MHz,CST8.00MTW,INTERNAL,2.5mm	X1
RES,CONV,MF,100K,0.25W,1%,0.4",MF25 SERIES	R32
RES,CONV,MF,100K,0.25W,1%,0.4",MF25 SERIES	R41
RES,CONV,MF,100K,0.25W,1%,0.4",MF25 SERIES	R31
RES,CONV,MF,100K,0.25W,1%,0.4",MF25 SERIES	R42
RES,CONV,MF,100K,0.25W,1%,0.4",MF25 SERIES	R43
RES,CONV,THERMISTOR,100K,0.5W,5%,2.5mm,NTC	THR1
DIODE,CONV,1N4005S,RECTIFIER,600V,1A,0%,DO-204	D2
RES,CONV,MF,27K,0.25W,1%,0.4",MF25 SERIES	R11
CON,PCBConnect,Housing,2WAY,15A,5mm,SCREW HORIZONTAL	CON3
CON,PCBConnect,Housing,2WAY,15A,5mm,SCREW HORIZONTAL	CON2
DIODE,CONV,ZENER,BZX55-C5V6,5.6V,500mW,5%,DO-35	D9
DIODE,CONV,ZENER,BZX55-C5V6,5.6V,500mW,5%,DO-35	D8
RES,CONV,MF,68K,0.25W,1%,0.4",MF25 SERIES	R20
RES,CONV,MF,68K,0.25W,1%,0.4",MF25 SERIES	R19
DIODE,CONV,SWITCHING,1N4937,600V,1A,0%,DO-41	D13
DIODE,CONV,SCHOTTKY,MBR360,60V,3A,0%,DO-27	D6
SUB11832,Main Board 3 Way Header Sub-assembly,A,1 Panel(s)	JP6
SUB11832,Main Board 3 Way Header Sub-assembly,A,1 Panel(s)	JP11
SUB11832,Main Board 3 Way Header Sub-assembly,A,1 Panel(s)	JP7
SUB11832,Main Board 3 Way Header Sub-assembly,A,1 Panel(s)	JP10
SUB11833,Main Board 12 Way Socket Sub-assembly,A,1 Panel(s)	CON1
SWITCH,CONV,ENCODER,?,5V DC,?,11mm PITCH	EN2
SWITCH,CONV,ENCODER,?,5V DC,?,11mm PITCH	EN1

Please note the same main board hardware and software is used on all models.

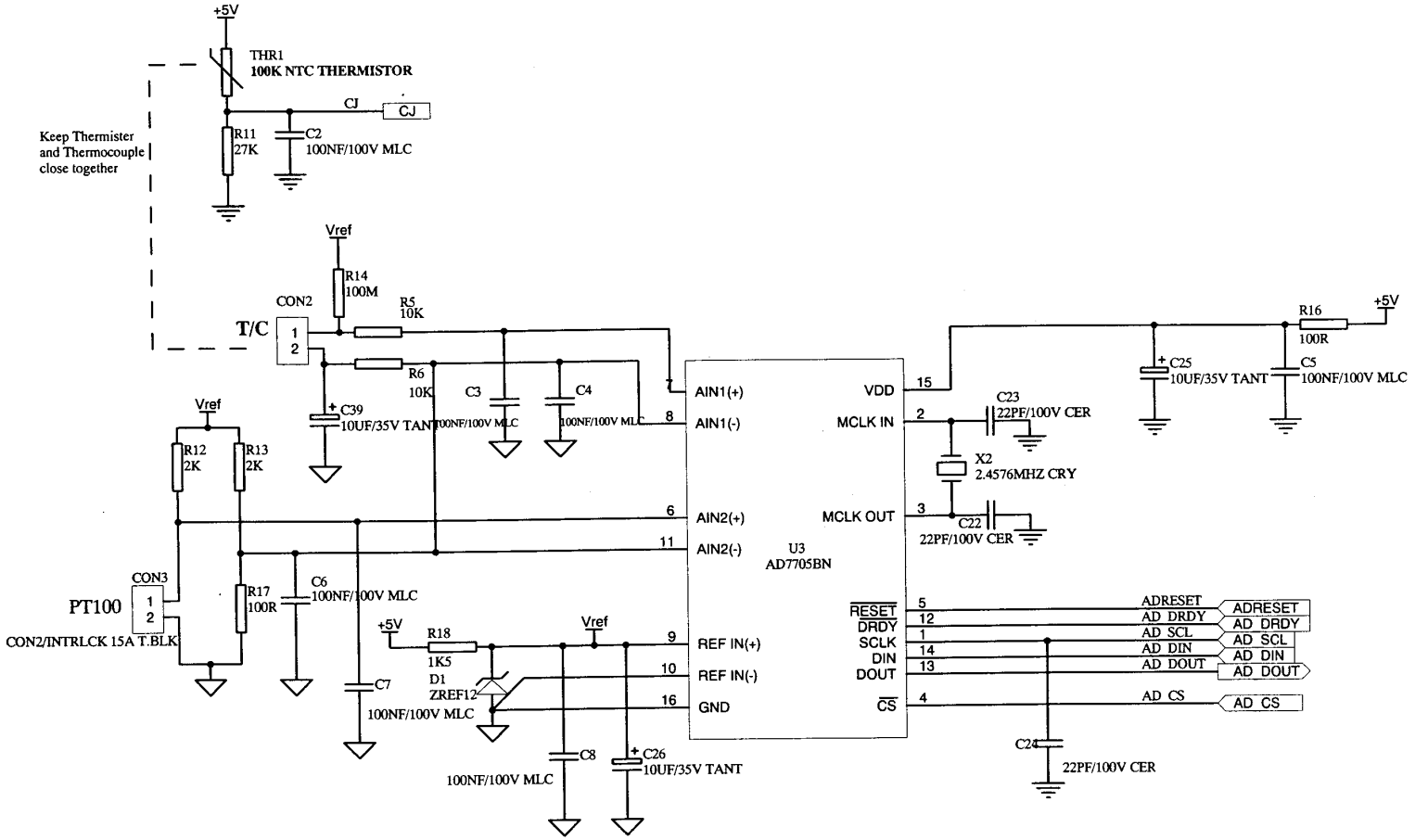
5.5 Display Board PCB Parts List

Display Board PCB Parts List	
Description	**Reference**
DIODE,CHIP,ZENER,BZX84C56,56V,350mW,5%,SOT-23	D6
TRANSISTOR,CHIP,BI-POLAR,NPN,MBTA42,40V,500mA,SOT-23	TR2
TRANSISTOR,CHIP,MOSFET,P-Channel,Si9953DY,20V,2.3A,SO-8	U4
TRANSISTOR,CHIP,MOSFET,N-Channel,SI9956DY,20V,3.5A,SO-8	U5
INDUCTOR,CONV,FERRITE,622LY-221K,220uH,500mA,5%,Radial,3mm or 5mm	L1
CAP,CHIP,CER,0.1uF,25V,10%,0805,X7R SERIES	C1
CAP,CHIP,CER,0.1uF,25V,10%,0805,X7R SERIES	C2
CAP,CHIP,CER,0.1uF,25V,10%,0805,X7R SERIES	C4
CAP,CHIP,CER,0.1uF,25V,10%,0805,X7R SERIES	C5
CAP,CHIP,CER,0.01uF,50V,10%,0805,X7R SERIES	C18
CAP,CHIP,CER,0.001uF,50V,0805	C10
CAP,CHIP,CER,0.001uF,50V,0805	C24
CAP,CHIP,CER,0.001uF,50V,0805	C14
CAP,CHIP,CER,0.001uF,50V,0805	C13
CAP,CHIP,CER,0.001uF,50V,0805	C12
CAP,CHIP,CER,0.001uF,50V,0805	C11
CON,PCBConnect,Header,6 WAY,1A,2.54mm,VERTICAL	JP2
CON,PCBConnect,Header,6WAY,3A,2.54mm,LOCKING	JP3
DIODE,CHIP,SWITCHING,BAV99,70V,350mW,0%,SOT-23	D4
RES,CHIP,MF,10K,0.125W,1%,0805,SMR85 SERIES	R1
RES,CHIP,MF,10K,0.125W,1%,0805,SMR85 SERIES	R2
RES,CHIP,MF,100R,0.125W,1%,0805,SMR85 SERIES	R7
RES,CHIP,MF,100K,0.125W,1%,0805,SMR85 SERIES	R8
RES,CHIP,MF,4.7K,0.125W,1%,0805,SMR85 SERIES	R6
RES,CHIP,MF,4.7K,0.125W,1%,0805,SMR85 SERIES	R4
RES,CHIP,MF,22K,0.125W,1%,0805,SMR85 SERIES	R14
RES,CHIP,MF,7.5K,0.125W,1%,0805,SMR85 SERIES	R15
RES,CHIP,MF,0R,0.125W,1%,0805,SMR85 SERIES	R20
RES,CHIP,MF,4.7K,0.25W,1%,1206,SMR126 SERIES	R17
RES,CHIP,MF,4.7K,0.25W,1%,1206,SMR126 SERIES	R19
PREMIUM HOTPLATE II DISPLAY BOARD	PCB1
DIODE,CHIP,SWITCHING,BAW56,70V,250mA,0%,SOT-23	D2
DIODE,CHIP,SWITCHING,BAW56,70V,250mA,0%,SOT-23	D3
CAP,CHIP,TANT,10uF,10V,10%,85C,Case A,CASE A,NOVER TYPE TC	C7
IC,CHIP,Micro,PIC16F876-20/SO,SO-28	U1
DIODE,CHIP,ZENER,1SMB5915BT3,5.1V,3W,5%,SMB	D7
TRANSISTOR,CHIP,MOSFET,N-Channel,BSP296,100V,2A,SOT-223	TR1
IC,CHIP,Driver,MC14049B,SO16	U3
CON,CrimpTerminal,Plug,5WAY,3A,2.54mm,VERTICAL	JP1
CON,PCBConnect,Header,12WAY,0,2.54mm,VERTICAL	JMP1
CAP,CONV,ELEC,100uF,25V,20%,85'C,Radial,2.5mm,RH SERIES	C9
CAP,CONV,ELEC,100uF,25V,20%,85'C,Radial,2.5mm,RH SERIES	C6
IC,CHIP,Logic,AT90S8515-8AI,44TQFP	U6
CAP,CONV,ELEC,1uF,100V,20%,105'C,Radial,0.2",RH SERIES	C19
CAP,CHIP,CER,1uF,10v,10%,0805,GRM40	C21
RES,CHIP,MF,3.9K,0.125W,1%,0805,SMR85 SERIES	R16
OSC,CONV,RESONATOR,8MHz,CST8.00MTW,INTERNAL,2.5mm	X2
OSC,CONV,RESONATOR,8MHz,CST8.00MTW,INTERNAL,2.5mm	X1
RES,CHIP,MF,33R,0.25W,1%,1206,SMR126 SERIES	R13
RES,CHIP,MF,33R,0.25W,1%,1206,SMR126 SERIES	R11
RES,CHIP,MF,33R,0.25W,1%,1206,SMR126 SERIES	R12
RES,CHIP,MF,33R,0.25W,1%,1206,SMR126 SERIES	R10
RES,CHIP,MF,47R,0.125W,1%,0805,SMR85 SERIES	R18
CAP,CHIP,CER,100nF,100V,10%,1210,X7R	C20
DIODE,CHIP,SWITCHING,BAS21,250V,200mA,0%,SOT-23	D5
ASS,11674,Encoder Board Assembly,A,55 Panel(s)	EN2
ASS,11674,Encoder Board Assembly,A,55 Panel(s)	EN1
LED,CONV,ULTRA BRIGHT,RED,L934SRDG,600mcd,20mA,3mm	D1
SPACER,LED3-6,2PIN,3MM DIA,6.1MM HIGH,ROUND	D1 HOLDER
WASHER,ALUMINIUM,M7,11.9MMO/D,0.6mmTHK	WASHER1
WASHER,ALUMINIUM,M7,11.9MMO/D,0.6mmTHK	WASHER2
NUT,M7,10.8MMA/F,2MMTHK	NUT1
NUT,M7,10.8MMA/F,2MMTHK	NUT2
SPACER,NYLON,8.5mm,10mm,2.54mm	SPACER5
SPACER,NYLON,8.5mm,10mm,2.54mm	SPACER6
SUB11831,Display Board 3 Way Socket Sub-assembly,A,1 Panel(s)	EN1 SOCKET1
SUB11831,Display Board 3 Way Socket Sub-assembly,A,1 Panel(s)	EN2 SOCKET2
SUB11831,Display Board 3 Way Socket Sub-assembly,A,1 Panel(s)	EN2 SOCKET1
SUB11831,Display Board 3 Way Socket Sub-assembly,A,1 Panel(s)	EN1 SOCKET2
FOAM SPACERS ADHESIVE BACKED 8MM X 8MM	SPACER4
FOAM SPACERS ADHESIVE BACKED 8MM X 8MM	SPACER3
FOAM SPACERS ADHESIVE BACKED 8MM X 8MM	SPACER2
FOAM SPACERS ADHESIVE BACKED 8MM X 8MM	SPACER1
DISPLAY,CONV,VFD,GREEN,MN12832E,200mA,NA,128x32	DS1

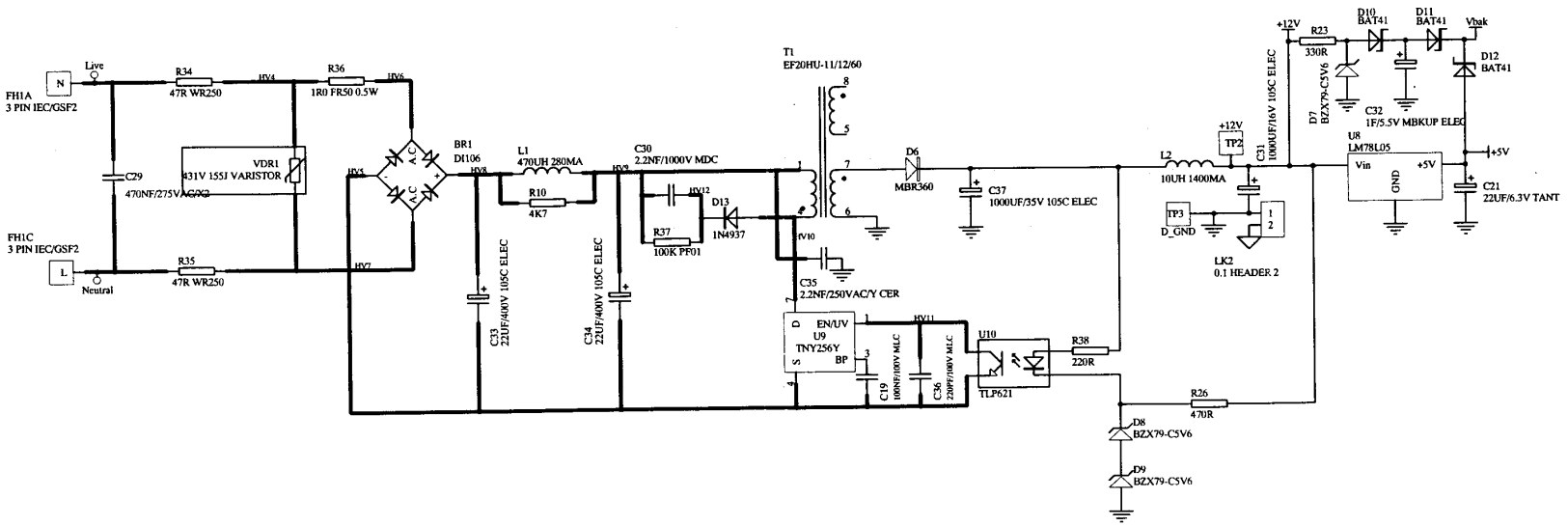
Please note the hardware for the display PCB is the same in all models. The only variation between the different models (SD160, SD162 & CD162) is the operating software.

6.0 Circuit Diagrams

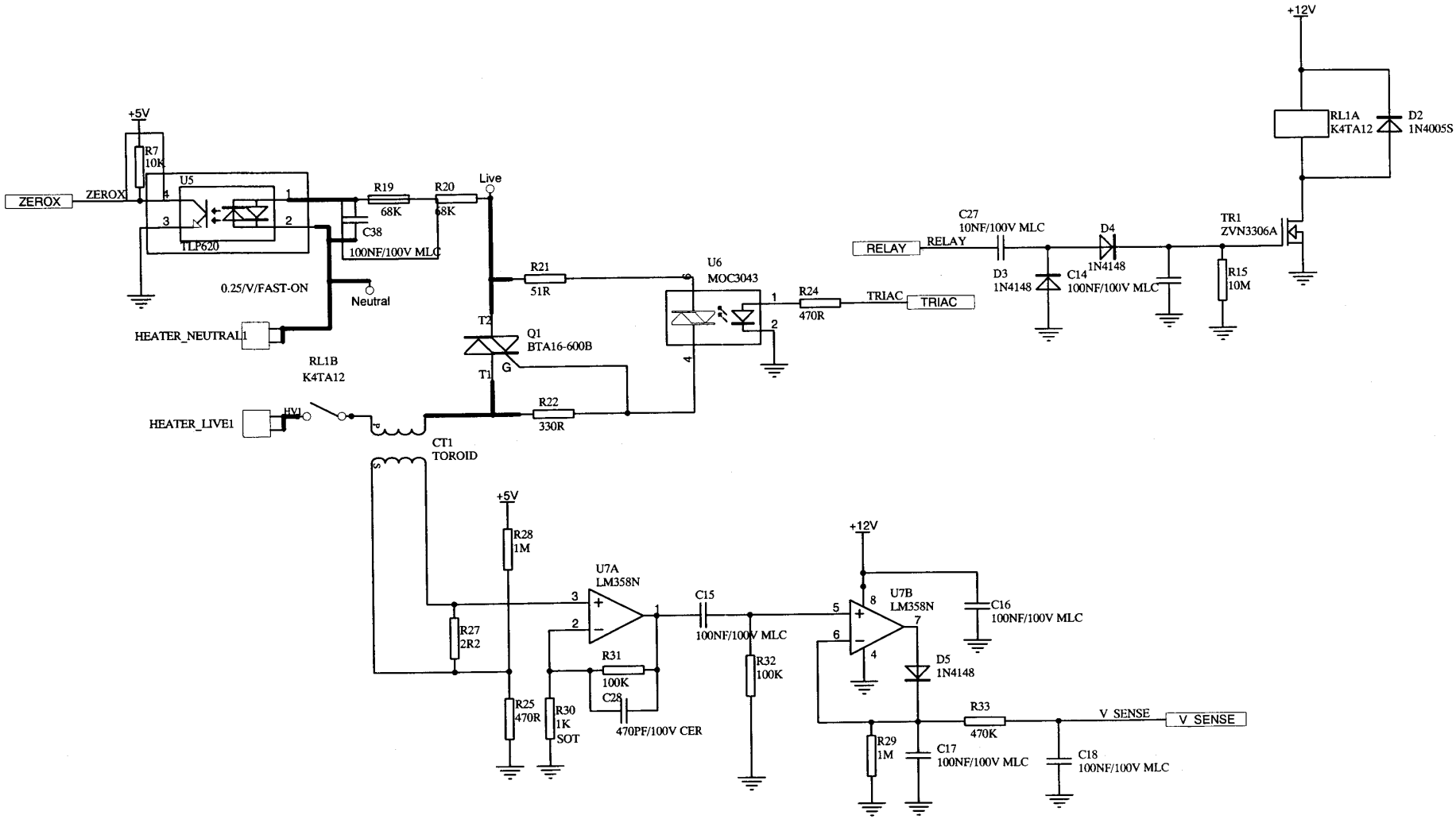
6.1 Circuit Diagram Data Acquisition Main Board



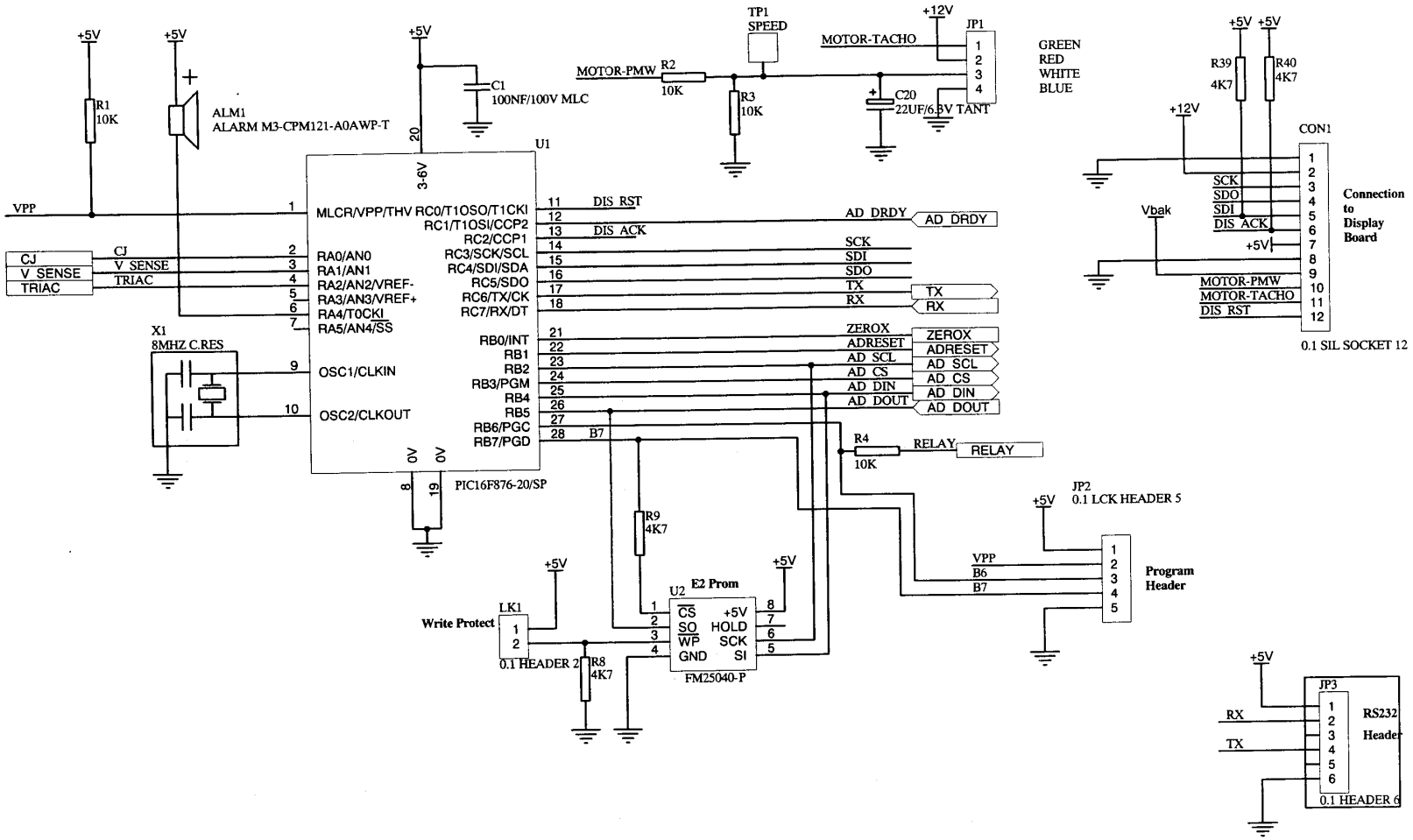
6.2 Circuit Diagram Power Supply Main Board



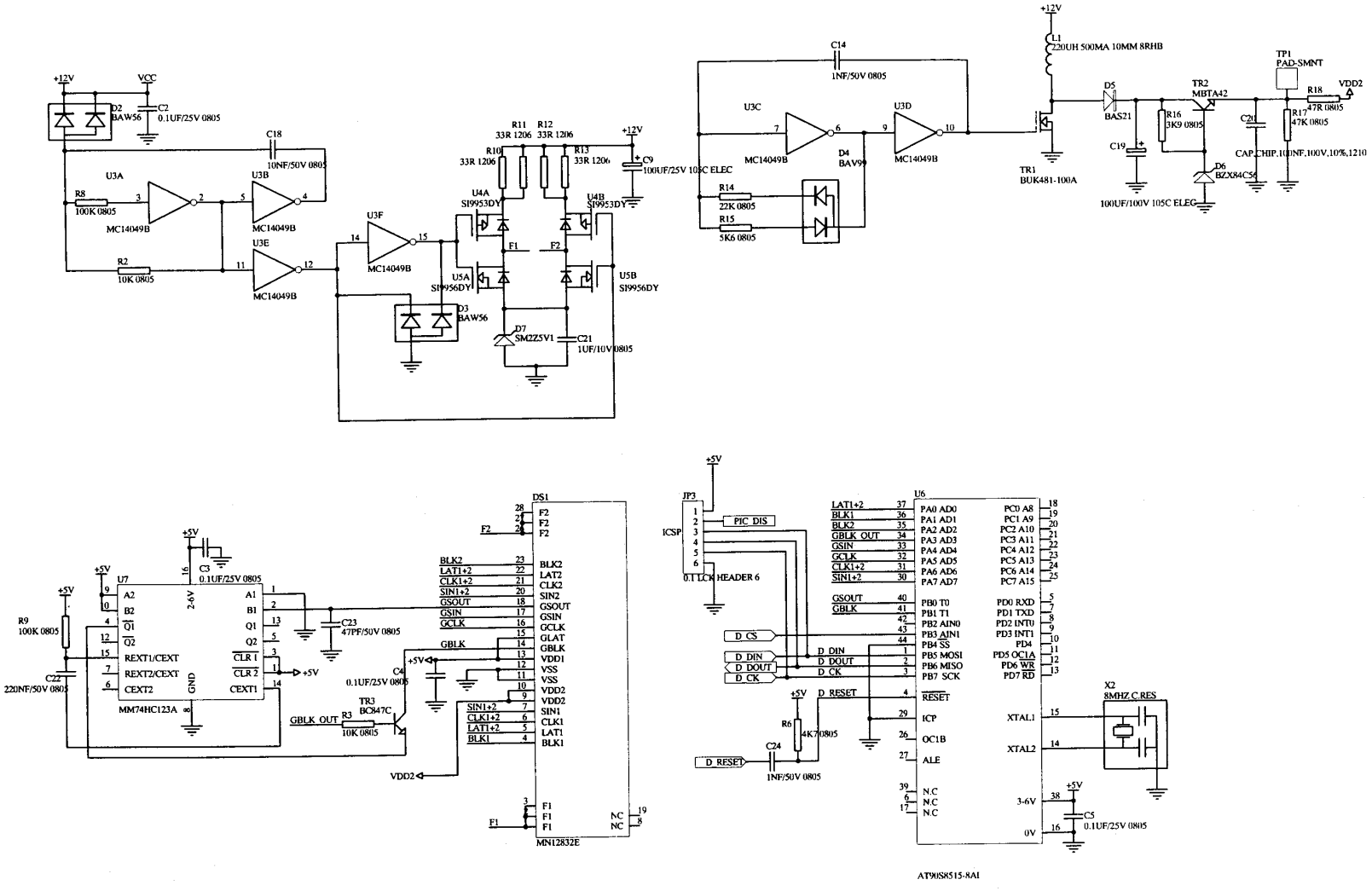
6.3 Circuit Diagram Heater Control Main Board



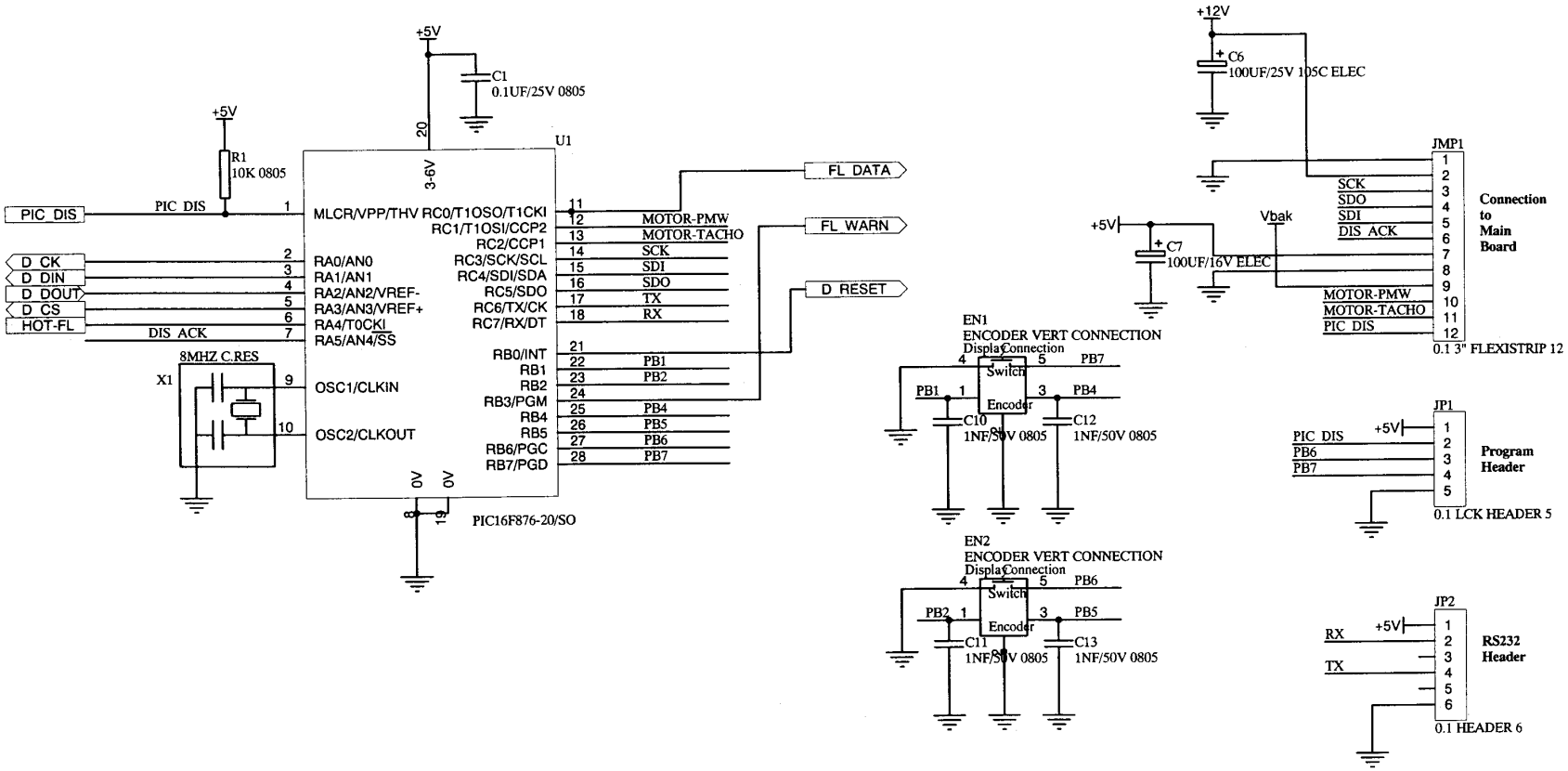
6.4 Circuit Diagram Micro Controller Main Board



6.5 Circuit Diagram Display Board



6.6 Circuit Diagram Micro Control Display Board



7.0 Troubleshooting Guide & Error Codes

To inform the operator that 1 or more errors have occurred a message will be displayed of the form ERR XXXX.
Where XXXX will give an error code to enable the type of error to be determined. The codes are additive if more than one fault present.

Symptom	Indicator Status		Check Or Suspect	Action
	Vac Florescent Display	Red Hot LED		
Not Functioning	✗	✗	a) Mains Supply Present	Restore Supply
			b) Internal Fuses	Replace Fuse
			c) Power supply failure (Check for 5 & 12v O/P)	Replace Main board
			d) Display ribbon cable is fitted Ok	Check / refit
Buzzer Sounds and Error Code Displayed	Error 0001	✓	Probe out of sample	Ensure probe is in contact with sample
	Error 0002	✓	Probe open circuit	Check wiring & connectors / replace probe
	Error 0004	✓	Probe short circuit	Check wiring / replace probe
	Error 0008	✓	Probe to hot	Sample temp above 200°C maximum probe temp
	Error 0010	✓	Thermocouple to hot or open circuit	Check wiring / replace thermocouple
	Error 0020	✓	Motor stalled or disconnected	Free or replace motor (check connections)
	Error 0100	✓	Triac failure probably short circuit	Ensure triac thermally connected to casting / replace main board
	Error 0200	✓	Ambient temperature in case too high	Ensure adequate ventilation (is ambient temp above 40°C)
	Error 0400	✓	Failure to read data from external EEPROM	Check ribbon cable connections / board failure?
	Error 0800	✓	Error in reading data from display board	Check ribbon cable connections / board failure?
	Error 1000	✓	Failure to transmit data to display board	Check ribbon cable connections / board failure?
	Error 2000	✓	Failure to detect mains zero crossing	Main board failure replace board
	Error 4000	✓	Triac, heater or relay failure probably open circuit	Replace heater / replace main board
	Error 8000	✓	General fault set when any other set	
	Error C000	✓	Triac, heater or relay failure probably open circuit	Replace heater / replace main board

Key to Indicator Status

✓ = Indicator On
✗= Indicator Off

Thank you for reading this data sheet.

For pricing or for further information, please contact us at our UK Office, using the details below.

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Please note - Product designs and specifications are subject to change without notice. The user is responsible for determining the suitability of this product.